

Student Name:

Student ID:

1- When 'a' ratio is greater than '1', then transmission delay is ..... Propagation delay.

- a. Equal
- b. Greater than
- ☒ c. Less than
- d. None of the above

2- The receiver sequence window slides upon arrival of the ..... with sequence number equal to ..... value.

- a. Ack, next expected
- ☒ b. Packet, next expected
- c. Ack, base sequence
- d. Packet, base sequence

3- List three benefits of splitting large files by the sender before sending into smaller chunks (fragments)

- 1- Error detection easier
- 2- Avoid making the buffer full
- 3- Saving time to send many data

4- Examine the following hamming codeword ( $C = 1111100$ ) and correct the error if there is one. Use matrix method and show your work.

$$\begin{bmatrix} 1 & 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \oplus 1 \oplus 0 \oplus 1 \oplus 1 \oplus 0 \oplus 0 = 0 \\ 1 \oplus 0 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 = 1 \\ 0 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 = 1 \end{bmatrix}$$

$S = 110$ ; so there is an error in bit  $d_2$

$$C = 1101100$$